

CLAIMS

1. A polypeptide having antimicrobial activity, comprising the amino acid sequence as set forth in SEQ ID NO:1, or a fragment thereof of at least 19 amino acids having antimicrobial activity:

5 $G-X_1-X_2-X_3-R-X_4-X_5-X_6-K-I-X_7-X_8-K-X_9-X_{10}-K-X_{11}-X_{12}-X_{13}-X_{14}-I-K-X_{15}-X_{16}-X_{17}-X_{18}-L-V-P$;
wherein

$X_1 = L$ or R ;

$X_2 = L$, V , I or F ;

$X_3 = R$ or K ;

$X_4 = L$, V , I or F ;

$X_5 = R$, K , W or G ;

$X_6 = K$, R , G , M , N or E ;

$X_7 = G$, R , K or E ;

$X_8 = G$, R , K or E ;

$X_9 = L$ or F ;

10 $X_{10} = K$ or R ;

$X_{11} = I$, L , F , C or Y ;

$X_{12} = G$, A or T ;

$X_{13} = Q$, R , L or P ;

$X_{14} = K$, I , M , L or V ;

$X_{15} = P$, A , H , N or D ;

$X_{16} = I$ or L ;

$X_{17} = R$, H , Q or P ;

$X_{18} = I$ or K ;

and wherein the amino acids making up the polypeptides are independently selected from D or L forms.

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2. A polypeptide having antimicrobial activity, comprising an amino acid sequence, which differs by at the most two amino acids from the amino acid sequence:

$G-X_1-X_2-X_3-R-X_4-X_5-X_6-K-I-X_7-X_8-K-X_9-X_{10}-K-X_{11}-X_{12}-Z$;

wherein

20 $X_1 = L$ or R ;

$X_2 = L$, V , I or F ;

$X_3 = R$ or K ;

$X_4 = L$, V , I or F ;

$X_5 = R$, K , W or G ;

$X_6 = K$, R , G , M , N or E ;

$X_7 = G$, R , K or E ;

$X_8 = G$, R , K or E ;

$X_9 = L$ or F ;

$X_{10} = K$ or R ;

$X_{11} = I$, L , F , C or Y ;

$X_{12} = G$, A or T ;

$Z = R$ or $X_{13}-X_{14}-I-K-X_{15}-X_{16}-X_{17}-X_{18}-L-V-P$;

25 wherein

$X_{13} = Q$, L or P ;

$X_{14} = K$, I , M , L or V ;

$X_{15} = P$, A , H , N or D ;

$X_{16} = I$ or L ;

$X_{17} = R$, H , Q or P ;

$X_{18} = I$ or K ;

and wherein the amino acids making up the polypeptides are independently selected from D or L forms.

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3. The polypeptide of claim 2, comprising an amino acid sequence, which differs by at the most two amino acids from the amino acid sequence, as set forth in SEQ ID NO:58,

$G-X_1-X_2-X_3-R-X_4-X_5-X_6-K-I-X_7-X_8-K-X_9-X_{10}-K-X_{11}-X_{12}-R$;

wherein

35 X_1 is L or R ;

X_2 is L or F ;

X_3 is R or K ;

X_4 is L or F ;

X_5 is R , K or G ;

X_6 is K , R or E ;

X_7 is G or K ;

X_8 is K , R or E ;

X_9 is L or F ;

X_{10} is K or R; X_{11} is I or L; X_{12} is A or T.

4. The polypeptide of claim 2, comprising an amino acid sequence, which differs by at the most two amino acids from the amino acid sequence, as set forth in SEQ ID NO:2,

5 $G-X_1-X_2-X_3-R-X_4-X_5-X_6-K-I-X_7-X_8-K-X_9-K-K-X_{10}-G-X_{11}-X_{12}-I-K-X_{13}-X_{14}-X_{15}-X_{16}-L-V-P$;
wherein

 $X_1 = L$ or R; $X_2 = L, V, I$ or F; $X_3 = R$ or K; $X_4 = L, V, I$ or F; $X_5 = R, W$ or G; $X_6 = K, R, G, M, N$ or E; $X_7 = G, R, K$ or E; $X_8 = G, R, K$ or E; $X_9 = L$ or F;10 $X_{10} = I, F, C$ or Y; $X_{11} = Q, L$ or P; $X_{12} = K, I, M, L$ or V; $X_{13} = P, A, H, N$ or D; $X_{14} = I$ or L; $X_{15} = R, H, Q$ or P; $X_{16} = I$ or K.

5. The polypeptide of claim 2, which comprises an amino acid sequence that has at the most 15 two substitutions, deletions and/or insertions of an amino acid as compared to amino acids 1 to 29 of SEQ ID NO:1, amino acids 1 to 29 of SEQ ID NO:2 or amino acids 1 to 19 of SEQ ID NO:58.

6. The polypeptide of claim 2, which comprises amino acids 1 to 29 of SEQ ID NO:1, amino 20 acids 1 to 29 of SEQ ID NO:2 or amino acids 1 to 19 of SEQ ID NO:58.

7. The polypeptide of claim 2, which consists of amino acids 1 to 29 of SEQ ID NO:1, amino acids 1 to 29 of SEQ ID NO:2 or amino acids 1 to 19 of SEQ ID NO:58.

25 8. A polynucleotide having a nucleotide sequence which encodes for the polypeptide defined in any of claims 1-7.

9. A nucleic acid construct comprising the nucleotide sequence defined in claim 8 operably linked to one or more control sequences that direct the production of the polypeptide in a 30 suitable host.

10. A recombinant expression vector comprising the nucleic acid construct defined in claim 9.

35 11. A recombinant host cell comprising the nucleic acid construct defined in claim 9.

12. A method for producing a polypeptide as defined in any of claims 1-7, the method comprising:

- (a) cultivating a recombinant host cell as defined in claim 10 under conditions conducive for production of the polypeptide; and
- (b) recovering the polypeptide.

5 13. A composition comprising an antimicrobial polypeptide as defined in any of claims 1-7.

14. The composition of claim 13, which further comprises an additional biocidal agent.

10 15. A method for killing or inhibiting growth of microbial cells comprising contacting the microbial cells with an antimicrobial polypeptide as defined in any of claims 1-7.

16. A detergent composition comprising a surfactant and an antimicrobial polypeptide as defined in any of claims 1-7.

15 17. An antimicrobial polypeptide as defined in any of claims 1-7 for use as a medicament.

18. An antimicrobial polypeptide as defined in any of claims 1-7 for use as an antimicrobial veterinarian or human therapeutic or prophylactic agent.

20 19. Use of an antimicrobial polypeptide as defined in any of claims 1-7 for use in the preparation of a veterinarian or human therapeutic agent for the treatment of a microbial infection or for prophylactic use.

25 20. Use of an antimicrobial polypeptide as defined in any of claims 1-7 for killing or inhibiting growth of microbial cells.

21. A transgenic plant, plant part or plant cell, which has been transformed with a nucleotide sequence encoding a polypeptide having antimicrobial activity as defined in any of claims 1-7.

30 22. Use of at least one antimicrobial polypeptide as defined in any of claims 1-7 in animal feed.

23. Use of at least one antimicrobial polypeptide as defined in any of claims 1-7 in the preparation of a composition for use in animal feed.

35 24. An animal feed additive comprising

- (a) at least one antimicrobial polypeptide as defined in any of claims 1-7; and

- (b) at least one fat soluble vitamin, and/or
- (c) at least one water soluble vitamin, and/or
- (d) at least one trace mineral, and/or
- (e) at least one macro mineral.

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25. The animal feed additive of claim 24, which further comprises phytase, xylanase, galactanase, and/or beta-glucanase.

26. An animal feed composition having a crude protein content of 50 to 800 g/kg and
10 comprising at least one antimicrobial polypeptide as defined in any of claims 1-7.